

WHAT IS CLAIMED IS:

1. A connector for medical instruments,
comprising:

5 a medical instrument adapted to be rendered active
upon receipt of electric power from a power supply to
allow a treating operation to be performed on a
subject;

10 a socket connectable to the medical instrument and
having a first electrode to allow the electric power to
be supplied to the medical instrument; and

a plug provided on the medical instrument and
connected to the socket to allow the electric power
which is fed from the power supply to be supplied to
the medical instrument, wherein

15 the plug includes a second electrode having an
exposed contact portion electrically connected to the
first electrode to allow the medical instrument to be
rendered active, at least the exposed contact portion
of the second electrode being so located as an
20 elongated portion as to extend along a moving direction
in which the socket is to be connected to the plug; and

an annular wall provided to surround at least the
exposed contact portion of the second electrode.

25 2. A connector for a medical instrument system,
according to claim 1, wherein the first electrode
comprises a plurality of electrode elements, the second
electrode comprises electrode elements corresponding in

number to those of the first electrode, and when the socket and plug are connected to each other, the electrode elements of the first and second electrodes are electrically connected together in mutually
5 corresponding relation.

3. A connector for medical instruments, according to claim 2, wherein the plug further comprises a projection with the electrode elements of the second electrode provided on a peripheral surface thereof, at
10 least the electrode elements of the second electrode being partly exposed on the peripheral surface of the projection, and the annular wall and the projection are spaced apart a predetermined distance from each other to define a circumferential groove therebetween.

4. A connector for medical instruments, according to claim 3, wherein the height of the annular wall from a bottom surface of the circumferential groove is
15 higher than that of the projection from the bottom of the circumferential groove.

5. A connector for medical instruments, according to claim 1, wherein the annular wall formed to surround the second electrode constitutes a first annular wall, and the plug further comprises a projection provided
20 inside the first annular wall and formed with the second electrode, and the socket further comprises a second annular wall engageable with the projection and formed with the first electrode.
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6. A connector for medical instruments, according to claim 5, wherein the socket further comprises a third annular wall engageable with the first annular wall and higher than the second annular wall.

5 7. A connector for medical instruments, according to claim 5, wherein, when the socket is connected to the plug, the second annular wall engages the projection and the first electrode is electrically connected to the second electrode.

10 8. A connector for medical instruments according to claim 1, further comprising:

 an element provided to the plug and configured to detect the type of medical instruments;

 a third electrode provided to the plug and
15 electrically connected to the element; and

 a fourth electrode provided to the socket and electrically connectable to the third electrode.

 9. A connector for medical instruments, according to claim 8, wherein the element has an electric
20 resistor.

 10. A connector for medical instruments, according to claim 1, further comprising:

 an element configured to detect the type of medical instrument and provided to the plug so as to
25 enable an electric power which is suitable for the medical instrument to be supplied from the power supply.

11. A connector for medical instruments, according to claim 10, wherein the element has an electric resistor.

12. A connector for medical instruments,
5 comprising:

a medical instrument adapted to be rendered active upon receipt of electric power to perform a medical operation on a subject;

10 a socket having a first electrode for supplying an electric power from a power supply to the medical instrument; and

a plug provided on the medical instrument and connected to the socket to allow the electric power which is fed from the power supply to be supplied to
15 the medical instrument, wherein the plug includes

a projection provided at a central area;

a second electrode provided on a peripheral surface of the projection and having at least a portion exposed on the peripheral surface of the projection and
20 electrically connectable to the first electrode to allow the medical instrument to be rendered active; and

an annular wall provided to surround the peripheral surface of the projection, the annular wall and projection being spaced apart a predetermined
25 distance from each other to define a circular groove therebetween.

13. A connector for medical instruments, according

to claim 12, wherein the first electrode comprises a plurality of electrode elements, the second electrode comprises electrode elements corresponding in number to those of the first electrode, and when the socket and plug engage each other, the elements of the first and second electrodes are electrically connected together in a mutually corresponding relation.

14. A connector for medical instruments, according to claim 12, wherein the height of the annular wall from a bottom surface of the circular groove is higher than that of the projection from the bottom surface of the circular groove.

15. A connector for medical instruments, according to claim 12, wherein the annular wall provided to surround the second electrode constitutes a first annular wall and the plug further comprises a projection provided inside the first annular wall and formed with a second electrode, and the socket further comprises a second annular wall engageable with the projection and formed with the first electrode.

16. A connector for medical instruments, according to claim 15, wherein the socket further comprises a third annular wall connectible with the first annular wall and higher than the second annular wall.

17. A connector for medical instruments, according to claim 15, wherein, when the socket is connected to the plug, the second annular wall engages the

projection and the first electrode is electrically connected to the second electrode.

18. A connector for medical instruments, according to claim 12, further comprising:

5 an element provided in the plug to detect the kinds of medical instruments;

 a third electrode provided in the plug and electrically connected to the element; and

10 a fourth electrode provided in the socket in such a way as to be electrically connectable with the third electrode.

19. A connector for medical instruments, according to claim 18, wherein the element is comprised of an electric resistor.

15 20. A connector for medical instruments, according to claim 12, further comprising: an element configured to detect the type of medical instrument and provided in the plug to enable an electric power which is suitable for the medical instrument to be fed from the
20 power supply.

21. A connector for medical instruments, according to claim 20, wherein the element is comprised of an electric resistor.

22. A connector for medical instrument, according to claim 1, wherein the second electrode is comprised of an elongated plate-like electrode extending in a moving direction in which the plug is connected to the
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socket.

23. A connector for medical instruments, according to claim 1, wherein the first electrode is comprised of an elongated, elastic plate-like electrode extending in a moving direction in which the plug is connected to the socket.

24. A connector for medical instruments, according to claim 1, further comprising: a guide provided in the plug to restrict a moving direction of the socket when the socket is connected to the plug.

25. A connector for medical instruments, according to claim 1, further comprising: a lock section provided in the plug and a lever provided in the socket to provide a latching engagement, wherein the lever includes a latching section for allowing an automatic latching engagement to be made with the lock section when the plug is attached to the socket and an operation section for allowing the latched lever to be disengaged.

26. A connector for medical instruments, according to claim 1, wherein the socket further comprises one cable for feeding an electric power from a power supply to a medical instrument to be used and the socket is connected to the cable and exchangeably connectable to a plurality of the same plug type of medical instruments.

27. A connector for medical instruments,

comprising a transducer for converting a drive current to an ultrasonic vibration, a socket connected to a cable for feeding a drive current from a generator to the transducer, a plug removably attached to the socket, and an ultrasonic handpiece having the transducer and plug, the connector comprising:

a projection formed at a central area of the plug;

an annular wall formed to surround the projection in a way to be spaced apart a distance from the projection; and

an electric contact formed on a peripheral area of the projection at a position surrounded with the annular wall.

28. A connector for medical instruments, according to claim 27, wherein the electric contact is provided on the peripheral surface of the projection and arranged parallel to a longitudinal axis of the handpiece.

29. A connector for medical instruments, according to claim 28, wherein the electric contact is arranged at a position spaced apart by more than a width of the electric contact from a deep bottom of a circumferential groove defined between the annular wall and the projection and is exposed on the projection.

30. A connector for medical instruments, according to claim 28, wherein the width of the circumferential groove defined between the projection and the annular

wall is greater than the width of the electric contact but smaller than the diameter of the projection.

31. A connector for medical instruments, according to claim 30, wherein the plug further comprises a fitting groove formed parallel to the longitudinal axis of the handpiece at a position between electric contacts arranged on the outer peripheral surface of the projection.

32. A connector for medical instruments, according to claim 29, wherein the electric contact is arranged at a position spaced apart by more than the width of the electric contact, on the deep side of the circumferential groove, from the forward end surface of the projection.

33. A connector for medical instruments, comprising:

a transducer for converting a drive current to an ultrasonic vibration, a socket connected to a cable for feeding the drive current from a generator to the transducer, a plug removably attached to the socket, an ultrasonic handpiece having the transducer and plug,

a first electric contact provided in the socket, and

a second electric contact provided in the plug and electrically connected to the first electric contact,

wherein the plug has an annular wall formed around the electric contact to surround the electric contact.

34. A connector for medical instruments, according to claim 33, wherein the plug further comprises an adapter provided on the outer periphery of the annular wall to allow the socket to be set in a latching engaged state.

35. A connector for medical instruments, comprising a transducer for converting a drive current to an ultrasonic vibration, an ultrasonic handpiece having the transducer, a plug provided on the ultrasonic handpiece and having a first electric contact, a handpiece socket removably attached to the plug, a cable unit for supplying a drive current from a generator to the transducer, and a socket provided on the handpiece socket and having an inner space for allowing a connector projection of a plug section of the ultrasonic handpiece to be fitted therein, wherein the socket includes a slit extending from an outer surface thereof into the inner space and a second electric contact provided in the slit to be set in contact with the first electric contact.

36. A connector for medical instruments, according to claim 35, wherein one end of the second electric contact is fixedly supported in the socket and the other end portion thereof is elastically deformable.

37. A connector for medical instruments, according to claim 36, wherein the slit is formed parallel to a longitudinal axis of the socket.

38. A connector for medical instruments, according to claim 37, wherein the socket has a first annular wall and second annular wall, the second annular wall being situated inside the first annular wall and the slit being formed in the second annular wall.

39. A connector for medical instruments, according to claim 38, wherein the second annular wall is lower than the first annular wall.

40. A connector for medical instruments, according to claim 38, wherein the socket further comprises a circular packing located at a bottom between the first annular wall and the second annular wall to maintain a water-tight seal between a casing and the socket.

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